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No. 43—1909.

British Engineering Standards Association.

(Incorporated 1918.)

FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE

BY

THE INSTITUTION OF CIVIL ENGINEERS.
THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.

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STANDARD SPECIFICATION

FOR

CHARCOAL IRON

LAPWELDED BOILER TUBES.

LONDON:
PUBLISHED FOR THE ASSOCIATION BY CROSBY LOCKWOOD & SON,
7, STATIONERS' HALL COURT, LUDGATE HILL, E.C. 4; AND 5, BROADWAY, LONDON, S.W. 1.
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PREFACE.

The Sectional Committee on Locomotives was appointed at the Meeting of the Main Committee held on April 16th, 1902, and the Sectional Committee on Railway Rolling Stock Underframes at the Meeting of the Main Committee held on July 16th, 1901.

The question of recommending Standards for Wrought Iron for use in Railway Rolling Stock having been brought to the notice of the Sectional Committees on Locomotives and Railway Rolling Stock Underframes, the Sub-Committee on Wrought Iron for use in Railway Rolling Stock was appointed at a joint Meeting held on May 31st, 1907, and the appointment was confirmed by the Main Committee at their Meeting on June 6th, 1907.

The first Meeting of the Sub-Committee was held on July 19th, 1907, and three Meetings have so far been held. A request was received from the Tube Manufacturers early in the course of the Sub-Committee's work that a Standard for Charcoal Iron Boiler Tubes should be formulated, and this Specification was accordingly drawn up. It has been thought desirable to issue the Specification at the present juncture rather than to defer publication until the Report on Wrought Iron for other purposes was complete, though it is hoped to publish the Standard Specification for Wrought Iron for use in Railway Rolling Stock at no very distant date.

This Report was adopted by the Sectional Committees on Locomotives and Railway Rolling Stock Underframes in April, 1909.

This Report was approved by the Main Committee in April, 1909.

Note.—*The Association desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the material herein referred to, but does not purport to include all the necessary provisions of a Contract.*

BRITISH STANDARD SPECIFICATION FOR CHARCOAL IRON LAPWELDED BOILER TUBES.

Quality of Material.

1. The Tubes shall be lapwelded and shall be made from genuine Swedish charcoal puddled iron of the best quality.

Freedom from Defects.

2. The Tubes must be perfectly sound and well-finished, clean, and free from surface defects and rust, and the ends must be faced clean and square. They must be of the dimensions specified, and of uniform thickness, and, unless otherwise specified, of uniform diameter throughout.

Annealing.

3. Tubes shall be carefully annealed at both ends.

Mechanical Tests.

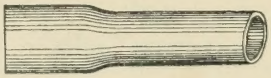
4. The Manufacturer shall provide, at his own expense, for mechanical testing, in accordance with Clauses 5, 6, 7 and 8, extra Tubes at the rate of two per cent. of each diameter of Tube ordered under the Contract, and the representative of the Engineer (or of the Purchaser) shall select and test such of the Tubes as he may think proper, to the extent of such percentage. Should the number of tubes ordered of any one diameter exceed 400, then for every hundred Tubes or part thereof above that amount, one additional Tube only shall be provided.

Tensile Tests.

5. The Tubes or Strips cut from the Tubes shall show a tensile strength between the limits of 19 and 24 tons per square inch inclusive, with a contraction of area of the metal of not less than 45 per cent.

Bulging Test.

6. The Tubes must stand bulging both hot and cold without showing either crack or flaw until the diameter of the bulged end measures not less than 15 per cent. greater than the original diameter of the Tube when tested hot and 10 per cent. greater than the original diameter of the Tube when tested cold.

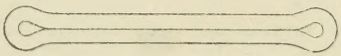


Crushing down Test.

7. A piece of Tube 2 ins. long shall be placed on end and must stand hammering down, until it is reduced to $1\frac{3}{8}$ ins. high, without showing crack or flaw.

Flattening Test.

8. The Tubes must when cold stand flattening until the interior surfaces of the Tubes meet without showing crack or flaw.



Hydraulic Test.

9. All Tubes shall be tested by an internal hydraulic pressure of at least 750 lbs. per sq. in., and any Tubes failing to stand this test will be rejected.

Additional Tests.

10. Should a Tube selected for testing purposes, in accordance with Clause 4, show definite signs of failure in any one or more of the tests specified in Clauses 5, 6, 7 and 8, two further Tubes shall be taken and the test or tests which failed shall be repeated on a piece or pieces cut from each of these Tubes, and if the repeat tests from both tubes are satisfactory the Tubes shall be accepted, if in other respects they fulfil the conditions of the Specification, but if definite defects are again shown, the batch of tubes which the test pieces represent shall be rejected.

Inspection.

11. The representative of the Engineer (or of the Purchaser) shall have free access to the works of the Manufacturer at all reasonable times; he shall be at liberty to inspect the manufacture at any stage, and to reject any material that does not conform to the terms of this Specification.

Testing Facilities.

12. The Manufacturer shall, at his own cost, furnish and prepare the necessary test pieces, and supply labour and appliances for such testing as may be carried out on his premises in accordance with this Specification. Failing facilities at his own works for carrying out the prescribed tests, the Manufacturer shall bear the cost of carrying out the tests elsewhere.

British Engineering Standards Association.

PRICE LIST

OF

BRITISH STANDARD SPECIFICATIONS AND REPORTS.

MARCH, 1919.

(This List cancels all previous Lists.)

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